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TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371

INTERNATIONAL APPLICATION NO.

PCT/DE00/03296

INTERNATIONAL FILING DATE

September 21, 2000

PRIORITY DATE CLAIMED

September 27, 1999

TITLE OF INVENTION

CONTRACTOR ARRANGEMENT

APPLICANT(S) FOR DO/EO/US

Oliver BRAUBURGER

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39 (1).
4. ☒ The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 - a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau). WO 01/24213 A1
 - b. ☒ has been transmitted by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
 - a. ☒ is transmitted herewith.
 - b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4)
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)).
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☒ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 20. below concern document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98-1449 and International Search Report (PCT/ISA/210) in German with FIVE (5) references and German Translation Aid..
12. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A FIRST preliminary amendment.
14. ☐ A SECOND or SUBSEQUENT preliminary amendment.
15. ☒ A substitute specification.
16. ☐ A change of power of attorney and/or address letter.
17. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821-1.825.
18. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
19. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
20. ☒ Other items or information:
 - 1) THREE (3) sheets of Formal Drawings

PATENT
32860-000294/US

IN THE U.S. PATENT AND TRADEMARK OFFICE

Applicants: Oliver BRAUBURGER
Int'l App. No.: PCT/DE00/03296
Application No.: NEW
Filed: March 27, 2002
For: CONTRACTOR ARRANGEMENT

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, DC 20231

March 27, 2002

Sir:

The following preliminary amendments and remarks are respectfully submitted in connection with the above-identified application.

IN THE ABSTRACT

Please replace the Abstract with the attached revised Abstract.

IN THE CLAIMS

Please amend the claims as follows:

1. (Amended) A contactor arrangement, comprising:

two contactors; and

a blocking element, wherein the contactors include guides for contact supports, wherein the blocking element is deflectable from an intermediate position to a blocking position by a guide of an operated contactor when one of the contactors is operated, the blocking position preventing operation of an unoperated contactor, wherein the guide of the unoperated contactor acts in an operating region on the blocking element if an attempt is

made to operate the unoperated contactor, wherein the guides act directly on the blocking element, and wherein essentially only compression forces occur in the blocking element as a result of an attempt to operate it.

2. (Amended) The contactor arrangement as claimed in claim 1, wherein, when an attempt is made to operate it, the blocking element is pressed underneath the operating region against at least one stop, such that the blocking element is supported on the at least one stop during the operating attempt.

3. (Amended) The contactor arrangement as claimed in claim 1, wherein, when an attempt is made to operate it, essentially only compression forces also occur in the guide of the unoperated contactor.

4. (Amended) The contactor arrangement as claimed in claim 1, wherein side surfaces of the contactors face one another, wherein the blocking element is arranged in a blocking element holder, and wherein the blocking element holder is arranged between the contactors.

5. (Amended) The contactor arrangement as claimed in claim 4, wherein the blocking element is pivotable in a pivoting plane which runs at right angles to the side surfaces.

6. (Amended) The contactor arrangement as claimed in claim 4, wherein the guides act on the blocking element in an operating direction, and wherein the operating direction runs parallel to the side surfaces.

7. (Amended) The contactor arrangement as claimed in claim 4, wherein the blocking element holder is arranged at least partially recessed in the contactors.

8. (Amended) The contactor arrangement as claimed in claim 7, wherein the side surfaces are adjacent to one another.

9. (Amended) The contactor arrangement as claimed in claim 4, wherein the contactors each include one front face and one rear face, opposite the front face, and wherein the rear faces and the blocking element holder end flush with one another.

10. (Amended) The contactor arrangement as in claim 1, wherein the blocking element is in the form of a rotating cardioid.

11. (Amended) The contactor arrangement as claimed in claim 10, wherein at least three load contacts can respectively be operated via the contact supports.

Please add the following new claims:

-- 12. The contactor arrangement as claimed in claim 2,
wherein, when an attempt is made to operate it, essentially only compression forces also occur in the guide of the unoperated contactor.

13. The contactor arrangement as claimed in claim 2, wherein side surfaces of the contactors face one another, wherein the blocking element is arranged in a blocking element holder, and wherein the blocking element holder is arranged between the contactors.

14. The contactor arrangement as claimed in claim 3, wherein side surfaces of the contactors face one another, wherein the blocking element is arranged in a blocking element holder, and wherein the blocking element holder is arranged between the contactors.

15. The contactor arrangement as claimed in claim 5, wherein the guides act on the blocking element in an operating direction, and wherein the operating direction runs parallel to the side surfaces.

16. The contactor arrangement as claimed in claim 5, wherein the contactors each include one front face and one rear face, opposite the front face, and wherein the rear faces and the blocking element holder end flush with one another.

17. The contactor arrangement as claimed in claim 5, wherein the blocking element holder is arranged at least partially recessed in the contactors.

18. The contactor arrangement as claimed in claim 17, wherein the side surfaces are adjacent to one another. --

REMARKS

Claims 1-18 are now present in this application, with new claims 12-17 being added by the present Preliminary Amendment. It should be noted that the amendments to original claims 1-11 of the present application are non-narrowing amendments, made solely to place the claims in proper form for U.S. practice and not to overcome any prior art or for any other statutory considerations. For example, amendments have been made to broaden the claims; remove reference numerals in the claims; remove the European phrase "characterized in that"; remove multiple dependencies in the claims; and to place claims in a more recognizable U.S. form, including the use of the transitional phrase "comprising" as well as the phrase "wherein". Other such non-narrowing amendments include placing apparatus-type claims (setting elements forth in separate paragraphs) in a more recognizable U.S. form. Again, all amendments are non-narrowing and have been made solely to place the claims in proper form for U.S. practice and not to overcome any prior art or for any other statutory considerations.

SUBSTITUTE SPECIFICATION

In accordance with 37 C.F.R. §1.125, a substitute specification has been included in lieu of substitute paragraphs in connection with the present Preliminary Amendment. The substitute specification is submitted in clean form, attached hereto, and is accompanied by a marked-up version showing the changes made to the original specification. The changes have been made in an effort to place the specification in better form for U.S. practice. No new matter has been added by these changes to the specification. Further, the substitute specification includes paragraph numbers to facilitate amendment practice as requested by the U.S. Patent and Trademark Office.

CONCLUSION

Accordingly, in view of the above amendments and remarks, an early indication of the allowability of each of claims 1-18 in connection with the present application is earnestly solicited.

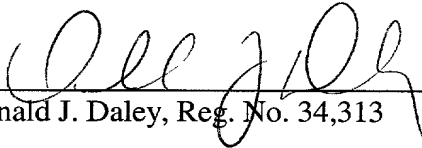
Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Donald J. Daley at the telephone number of the undersigned below.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 08-0750 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

HARNESS, DICKEY & PIERCE, P.L.C

By: _____


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ABSTRACT OF THE DISCLOSURE

Two contactors are mutually interlocked via a blocking element which is arranged between the contactors. The blocking element interacts with guides on the contact supports of the contactors. The guides act directly on the blocking element. Only compression forces, but no tensile forces or shear forces, now occur in the blocking element, as a result of this and as a result of the blocking element being configured in a suitable manner.

SUBSTITUTE SPECIFICATION**Description****CONTACTOR ARRANGEMENT** ~~ontactor arrangement~~

[0001] This application is the national phase under 35 U.S.C. § 371 of PCT International Application No. PCT/DE00/03296 which has an International filing date of September 21, 2000, which designated the United States of America, the entire contents of which are hereby incorporated by reference.

Field of the Invention

[0002] The present invention generally relates to a contactor arrangement having two contactors and a blocking element. In one aspect,

— ~~with~~ the contactors include ~~having~~ guides for contact supports,

— ~~with~~ the blocking element being deflected from an intermediate position to a blocking position by the guide of the operated contactor when one of the contactors is operated, ~~The~~ which blocking position may prevents operation of the unoperated contactor,

— ~~with~~ Further, the guide of the unoperated contactor may ~~acting~~ in an operating region on the blocking element if an attempt is made to operate the unoperated contactor. In addition, and

— ~~with~~ the guides may ~~acting~~ directly on the blocking element.

Background o the Invention

[0003] ~~Contactors arrangements such as these~~ are known, for example, from DE 195 48 480 C1 or DE 24 40 361 A1.

[0004] EP 0 313 954 A1 discloses a contactor arrangement having two contactors and a blocking element, ~~in which~~ ~~t~~ The contactors have guides for contact supports, The blocking element is deflected from an intermediate position to a blocking position by the guide of the operated contactor when one of the contactors is operated, ~~which~~ The blocking position prevents operation of the unoperated contactor, ~~t~~ The guide of the unoperated contactor acts in an operating region on the blocking element if an attempt is made to operate the unoperated contactor. The guides act directly on the blocking element via pins.

[0005] Electrical loads are often connected to a supply network in different ways.

One example of such types of connection is the optional connection of a load in star or delta to a three-phase network or to a reversing circuit, in which either the polarity of the DC voltage is reversed or a three-phase network is connected to a load alternatively with a positive phase sequence and a negative phase sequence.

[0006] The electrical load is generally connected to the supply network via contactors. If both contactors were operated at the same time, this would result in a short between the phases. Such simultaneous operation of both contactors must therefore be prevented. In known arrangements~~the prior art~~, this is achieved by the contactor arrangements that have been mentioned.

[0007] If repeated attempts are made to operate the unoperated contactor, fatigue occurs over the course of time in the blocking elements ~~used in the prior art~~ mentioned ~~previously~~initially. Finally, they break, so that they can no longer carry out their function.

[0008] In the contactor arrangement according to EP 0 313 954 A1, the blocking element is coupled to the movement of the contact supports via pins, which are inserted at the side into the contact support guide. The movement of the contact supports is thus transmitted to the blocking element via the pins. When the blocking element is in the blocking position, then the movement of the contact support is blocked via the pin. This likewise prevents the unoperated contactor from being operated. In practice, it has been found that the high forces that occur result in the pins breaking off. The pins thus represent a weakness in this contactor arrangement.

SUMMARY OF THE INVENTION

[0009] ~~An~~The object of an embodiment of the present invention is to provide a contactor arrangement in which the guides act directly on the blocking element, and in which no fatigue nevertheless occurs in the blocking element.

[0010] Such an ~~The~~ object may be achieved wherein~~in that~~ essentially only compression forces occur in the blocking element as a result of any attempt to operate it.

[0011] An embodiment of ~~t~~The invention is based on the knowledge that fatigue in the blocking elements or the pins is caused by tensile and/or bending stresses. If the stress is essentially purely compressive, on the other hand, virtually no material fatigue occurs.

[0012] An essentially purely compressive stress can be produced particularly easily if, when an attempt to operate it is made, the blocking element is pressed underneath the operating region against at least one stop, so that the blocking

element is supported on the at least one stop during the attempt to operate it.

[0013] If, in addition, essentially only compression forces occur in the guide of the unoperated contactor when an attempt is made to operate it, virtually no material fatigue occurs in the guide of the unoperated contactor, either.

[0014] The contactor arrangement has a particularly simple design if side surfaces of the contactors face one another, the blocking element is arranged in a blocking element holder, and the blocking element holder is arranged between the contactors.

[0015] The creation of essentially only compression forces in the guide of the unoperated contactor can be achieved, in design terms, particularly easily if the blocking element can pivot in a pivoting plane which runs at right angles to the side surfaces.

[0016] The mechanical design becomes even simpler if the guides act on the blocking element in an operating direction, and the operating direction runs parallel to the side surfaces.

[0017] If the blocking element holder is arranged at least partially recessed in the contactors, the contactor arrangement occupies only a small amount of space. The occupied space is a minimum when the side surfaces are adjacent to one another.

[0018] If the contactors each have one front face and one rear face, which is opposite the front face, and the rear faces and the blocking element holder end flush with one another, this necessarily results in the blocking element being positioned in a defined manner. There is no longer any need for adjustments.

[0019] If the blocking element is in the form of a rotating cardioid, the blocking element operates particularly reliably.

[0020] In principle, the contactors may be of any desired configuration. Generally, however, at least three load contacts can respectively be operated via the contact supports.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] Further advantages and details result from the following description of an exemplary embodiment. In this case, illustrated in outline form, the drawings include:

- Figure 1 shows a contactor arrangement,
- Figure 2 shows a detail from Figure 1, in the form of a section, and
- Figure 3 shows a blocking element in a blocking element holder, in the form of a section.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0022] Figure 1 shows two contactors 1. One of the contactors 1 is shown in detail in this case, while the other contactor 1 is illustrated only schematically. The contactors 1 have side surfaces 2 which face one another, and a blocking element holder 3 is arranged between the contactors.

[0023] It is possible to arrange the contactors 1 at a distance from one another. However, preferably the side surfaces 2 are adjacent to one another. In this case in particular, the blocking element holder 3 is arranged completely or partially recessed in the contactors 1. The contactors 1 each have one front face 4 and one rear face 5, which is opposite the front face 4. The rear faces 5 and the blocking element holder 3 end flush with one another.

[0024] The blocking element holder 3 has an unobstructed accommodation width B. A blocking element 6 is arranged in the blocking element holder 3 and has a blocking element width b, which is slightly smaller than the unobstructed accommodation width B.

[0025] As can be seen from Figures 2 and 3, the blocking element is held in the blocking element holder 3 such that it can pivot in a pivoting plane 7. The accommodation width B extends at right angles to this pivoting plane 7. The side surfaces 2 and the pivoting plane 7 are at right angles to one another.

[0026] The contactors 1 have guides 8 for contact supports. At least one load contact can be operated by each of the contact supports. Preferably, even at least three load contacts can be operated via the contact supports. This makes it possible to connect a three-phase network to a load.

[0027] The blocking element 6 shown in Figures 2 and 3 is in the form of a so-called rotating cardioid 6 which has a cardioid tip 9 and operating regions 10. If neither contactor 1 is operated, the rotating cardioid 6 is held by a resetting spring 11 in an intermediate position, which is illustrated in Figures 2 and 3. By way of example, it is assumed in the following text that the left-hand one of the two contactors 1 is now operated first of all, and an attempt is then made to operate the right hand one of the two contactors 1, as well.

[0028] The operation of the left-hand contactor 1 results in its guide 8 being moved in an operating direction x. The operating direction x runs parallel to the side surfaces 2 and parallel to the pivoting plane 7. The operation of the left-hand guide 8 results in the cardioid tip 9 of the blocking element 6 being deflected into a holding chamber 12, which is essentially arranged underneath the guide 8 of the right-hand contactor 1. In this position, the blocking element 6 is located in a

blocking position, in which it is impossible to operate the right-hand contactor 1. The guide 8 in this case acts directly on the blocking element 6 in the operating region 10, which is located within the blocking element width b and hence, in particular, also within the accommodation width B .

[0029] If an attempt is now made to operate the right-hand contactor 1 as well, its guide 8 is likewise deflected in the operating direction x . The guide 8 of the right-hand contactor 1 in this case acts directly on the blocking element 6 in the corresponding operating region 10, which is likewise located within the blocking element width b , and is hence also within the accommodation width B . In consequence, the blocking element 6 is pressed against the blocking element holder 3 in the region of the holding chamber 12 and in a central region 13. It is thus supported against the blocking element holder 3 in the region of the holding chamber 12 and the central region 13. This prevents any further movement of the right-hand guide 8, and hence prevents operation of the right-hand contactor 1. The lower face of the holding chamber 12 and the central region 13 thus represent stops 12, 13 arranged underneath the operating region 10.

[0030] The guide 8 of the right-hand contactor 1 exerts an operating force F in the operating direction x onto the blocking element 6 when an attempt is made to operate it. However, since it acts within the accommodation width B , the operating force F acts directly on the blocking element holder 3, that is to say, in particular, without any deflection and hence without any shear forces occurring. Essentially only compression forces, but no tensile forces or shear forces, thus occur, to be precise both in the guides 8 and in the blocking element 6.

[0031] As already mentioned, the contactors 1 may have any desired configuration. In particular, they may be either in the form of air contactors or vacuum contactors. A combination of an air contactor and a vacuum contactor is also possible.

[0032] The invention being thus described, it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a departure from the spirit and scope of the invention, and all such modifications as would be obvious to one skilled in the art are intended to be included within the scope of the following claims.

What is claimed is Patent Claims:

1. (Amended) A contactor arrangement, comprising:

~~having two contactors; (1) and~~

~~-a blocking element (6), wherein~~

~~——with the contactors include (1) ~~having~~ guides (8) ~~for contact supportss,~~~~
~~wherein~~

~~——with the blocking element is (6) ~~being deflectable~~ from an intermediate position to a blocking position by ~~at~~ the guide (8) ~~of an~~ the operated contactor (1) when one of the contactors (1) is operated, ~~the~~ which blocking position ~~preventings~~ operation of ~~an~~ the unoperated contactor (1), wherein~~

~~——with the guide (8) of the unoperated contactor (1) acts in an operating region (10) on the blocking element (6) if an attempt is made to operate the unoperated contactor (1), and wherein~~

~~——with the guides (8) acting directly on the blocking element (6), and wherein~~

~~characterized~~

~~in that~~ essentially only compression forces occur in the blocking element (6) as a result of ~~an~~ the attempt to operate it.

2. (Amended) The contactor arrangement as claimed in claim 1,

wherein ~~characterized~~

~~in that~~, when an attempt is made to operate it, the blocking element (6) is pressed underneath the operating region (10) against at least one stop ~~(12, 13)~~, such that the blocking element (6) is supported on the at least one stop ~~(12, 13)~~ during the operating attempt.

3. (Amended) The contactor arrangement as claimed in claim 1 ~~or 2~~,

~~characterized~~

~~in that~~ wherein, when an attempt is made to operate it, essentially only compression forces also occur in the guide (8) of the unoperated contactor (1).

4. (Amended) The contactor arrangement as claimed in claim 1, ~~2 or 3~~,

~~characterized~~

~~in that~~, wherein the side surfaces (2) of the contactors (1) face one another, wherein ~~in that~~ the blocking element (6) is arranged in a blocking element holder (3), and wherein ~~that~~ the blocking element holder (3) is arranged between the contactors (1).

5. (Amended) The contactor arrangement as claimed in claim 4, wherein

~~characterized~~

~~in that~~ the blocking element (6) ~~can~~ is pivotal in a pivoting plane (7) which runs at right angles to the side surfaces (2).

6. (Amended) The contactor arrangement as claimed in claim 4 ~~or 5~~, wherein
the

~~characterized~~

~~in that the~~ guides (8) act on the blocking element (6) in an operating direction (~~x~~),
and wherein ~~that~~ the operating direction (~~x~~) runs parallel to the side surfaces (2).

7. (Amended) The contactor arrangement as claimed in claim 4, ~~5 or 6~~,
wherein

~~characterized~~

~~in that~~ the blocking element holder (3) is arranged at least partially recessed in the
contactors (1).

8. (Amended) The contactor arrangement as claimed in claim 7, wherein
characterized

~~in that~~ the side surfaces (2) are adjacent to one another.

9. (Amended) The contactor arrangement as claimed in ~~one of~~ claims 4 ~~to~~ 8,
wherein

~~characterized~~

~~in that~~ the contactors (1) each ~~include~~ have one front face (4) and one rear face (5),
~~which is opposite~~ the front face (4), and wherein ~~that~~ the rear faces (5) and the
blocking element holder (3) end flush with one another.

10. (Amended) The contactor arrangement as ~~claimed in~~ claim 1, ~~wherein~~
~~of the above claims~~,

~~characterized~~

~~in that~~ the blocking element (6) is in the form of a rotating cardioid (6).

11. (Amended) The contactor arrangement as claimed in claim 10, ~~wherein~~
~~of the above claims~~,

~~characterized~~

~~in that~~ at least three load contacts can respectively be operated via the contact
supports.

New

12. The contactor arrangement as claimed in claim 2,
wherein, when an attempt is made to operate it, essentially only compression
forces also occur in the guide of the unoperated contactor.

13. The contactor arrangement as claimed in claim 2, wherein side surfaces of the
contactors face one another, wherein the blocking element is arranged in a
blocking element holder, and wherein the blocking element holder is arranged

between the contactors.

14. The contactor arrangement as claimed in claim 3, wherein side surfaces of the contactors face one another, wherein the blocking element is arranged in a blocking element holder, and wherein the blocking element holder is arranged between the contactors.

15. The contactor arrangement as claimed in claim 5, wherein the guides act on the blocking element in an operating direction, and wherein the operating direction runs parallel to the side surfaces.

16. The contactor arrangement as claimed in claim 5, wherein the contactors each include one front face and one rear face, opposite the front face, and wherein the rear faces and the blocking element holder end flush with one another.

17. The contactor arrangement as claimed in claim 5, wherein the blocking element holder is arranged at least partially recessed in the contactors.

18. The contactor arrangement as claimed in claim 17, wherein the side surfaces are adjacent to one another.

Abstract

Contact~~or~~ arrangement

Two contactors (1) are mutually interlocked via a blocking element (6) which is arranged between the contactors (1). The blocking element (6) in this case interacts with guides (8) on the contact supports of the contactors (1). The guides (8) act directly on the blocking element (6). Only compression forces, but no tensile forces or shear forces, now occur in the blocking element, a (6), as a result of this and as a result of the blocking element (6) being configured in a suitable manner.

FIGURE 2

New Application
Docket No. 32860-000294/US

SUBSTITUTE SPECIFICATION

CONTACTOR ARRANGEMENT

[0001] This application is the national phase under 35 U.S.C. § 371 of PCT International Application No. PCT/DE00/03296 which has an International filing date of September 21, 2000, which designated the United States of America, the entire contents of which are hereby incorporated by reference.

Field of the Invention

[0002] The present invention generally relates to a contactor arrangement having two contactors and a blocking element. In one aspect, the contactors include guides for contact supports, with a blocking element being deflected from an intermediate position to a blocking position by the guide of the operated contactor when one of the contactors is operated. The blocking position may prevent operation of the unoperated contactor. Further, the guide of the unoperated contactor may act in an operating region on the blocking element if an attempt is made to operate the unoperated contactor. In addition, the guides may act directly on the blocking element.

Background o the Invention

[0003] Contactor arrangements are known, for example, from DE 195 48 480 C1 or DE 24 40 361 A1.

[0004] EP 0 313 954 A1 discloses a contactor arrangement having two contactors and a blocking element. The contactors have guides for contact supports. The blocking element is deflected from an intermediate position to a blocking position by the guide of the operated contactor when one of the contactors is operated. The blocking position prevents operation of the unoperated contactor. The guide of the unoperated contactor acts in an operating region on the blocking element if an attempt is made to operate the unoperated contactor. The guides act directly on the blocking element via pins.

[0005] Electrical loads are often connected to a supply network in different ways. One example of such types of connection is the optional connection of a load in star or delta to a three-phase network or to a reversing circuit, in which either the polarity of the DC voltage is reversed or a three-phase network is connected to a load alternatively with a positive phase sequence and a negative phase sequence.

[0006] The electrical load is generally connected to the supply network via contactors. If both contactors were operated at the same time, this would result in a short between the phases. Such simultaneous operation of both contactors must therefore be prevented. In known

arrangements, this is achieved by the contactor arrangements that have been mentioned.

[0007] If repeated attempts are made to operate the unoperated contactor, fatigue occurs over the course of time in the blocking elements mentioned previously. Finally, they break, so that they can no longer carry out their function.

[0008] In the contactor arrangement according to EP 0 313 954 A1, the blocking element is coupled to the movement of the contact supports via pins, which are inserted at the side into the contact support guide. The movement of the contact supports is thus transmitted to the blocking element via the pins. When the blocking element is in the blocking position, then the movement of the contact support is blocked via the pin. This likewise prevents the unoperated contactor from being operated. In practice, it has been found that the high forces that occur result in the pins breaking off. The pins thus represent a weakness in this contactor arrangement.

SUMMARY OF THE INVENTION

[0009] An object of an embodiment of the present invention is to provide a contactor arrangement in which the guides act directly on the blocking element, and in which no fatigue nevertheless occurs in the blocking element.

[0010] Such an object may be achieved wherein essentially only compression forces occur in the blocking element as a result of any attempt to operate it.

[0011] An embodiment of the invention is based on the knowledge that fatigue in the blocking elements or the pins is caused by tensile and/or bending stresses. If the stress is essentially purely compressive, on the other hand, virtually no material fatigue occurs.

[0012] An essentially purely compressive stress can be produced particularly easily if, when an attempt to operate it is made, the blocking element is pressed underneath the operating region against at least one stop, so that the blocking element is supported on the at least one stop during the attempt to operate it.

[0013] If, in addition, essentially only compression forces occur in the guide of the unoperated contactor when an attempt is made to operate it, virtually no material fatigue occurs in the guide of the unoperated contactor, either.

[0014] The contactor arrangement has a particularly simple design if side surfaces of the contactors face one another, the blocking element is arranged in a blocking element holder, and the blocking element holder is arranged between the contactors.

[0015] The creation of essentially only compression forces in the guide of the unoperated contactor can be achieved, in design terms, particularly easily if the blocking element can pivot in a pivoting plane which runs at right angles to the side surfaces.

[0016] The mechanical design becomes even simpler if the guides act on the blocking element in an operating direction, and the operating direction runs parallel to the side surfaces.

[0017] If the blocking element holder is arranged at least partially recessed in the contactors, the contactor arrangement occupies only a small amount of space. The occupied space is a minimum when the side surfaces are adjacent to one another.

[0018] If the contactors each have one front face and one rear face, which is opposite the front face, and the rear faces and the blocking element holder end flush with one another, this necessarily results in the blocking element being positioned in a defined manner. There is no longer any need for adjustments.

[0019] If the blocking element is in the form of a rotating cardioid, the blocking element operates particularly reliably.

[0020] In principle, the contactors may be of any desired configuration. Generally, however, at least three load contacts can respectively be operated via the contact supports.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] Further advantages and details result from the following description of an exemplary embodiment. In this case, illustrated in outline form, the drawings include:

Figure 1 shows a contactor arrangement,

Figure 2 shows a detail from Figure 1, in the form of a section, and

Figure 3 shows a blocking element in a blocking element holder, in the form of a section.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0022] Figure 1 shows two contactors 1. One of the contactors 1 is shown in detail in this case, while the other contactor 1 is illustrated only schematically. The contactors 1 have side surfaces 2 which face one another, and a blocking element holder 3 is arranged between the contactors.

[0023] It is possible to arrange the contactors 1 at a distance from one another. However, preferably the side surfaces 2 are adjacent to one another. In this case in particular, the blocking element holder 3 is arranged completely or partially recessed in the contactors 1. The contactors 1 each have one front face 4 and one rear face 5, which is opposite the front face 4. The rear faces 5 and the blocking element holder 3 end flush with one another.

[0024] The blocking element holder 3 has an unobstructed accommodation width B. A blocking element 6 is arranged in the blocking element holder 3 and has a blocking element width b, which is slightly smaller than the unobstructed accommodation width B.

[0025] As can be seen from Figures 2 and 3, the blocking element is held in the blocking element holder 3 such that it can pivot in a pivoting plane 7. The accommodation width B

extends at right angles to this pivoting plane 7. The side surfaces 2 and the pivoting plane 7 are at right angles to one another.

[0026] The contactors 1 have guides 8 for contact supports. At least one load contact can be operated by each of the contact supports. Preferably, even at least three load contacts can be operated via the contact supports. This makes it possible to connect a three-phase network to a load.

[0027] The blocking element 6 shown in Figures 2 and 3 is in the form of a so-called rotating cardioid 6 which has a cardioid tip 9 and operating regions 10. If neither contactor 1 is operated, the rotating cardioid 6 is held by a resetting spring 11 in an intermediate position, which is illustrated in Figures 2 and 3. By way of example, it is assumed in the following text that the left-hand one of the two contactors 1 is now operated first of all, and an attempt is then made to operate the right hand one of the two contactors 1, as well.

[0028] The operation of the left-hand contactor 1 results in its guide 8 being moved in an operating direction x. The operating direction x runs parallel to the side surfaces 2 and parallel to the pivoting plane 7. The operation of the left-hand guide 8 results in the cardioid tip 9 of the blocking element 6 being deflected into a holding chamber 12, which is essentially arranged underneath the guide 8 of the right-hand contactor 1. In this position, the blocking element 6 is located in a blocking position, in which it is impossible to operate the right-hand contactor 1. The guide 8 in this case acts directly on the blocking element 6 in the operating region 10, which is located within the blocking element width b and hence, in particular, also within the accommodation width B.

[0029] If an attempt is now made to operate the right-hand contactor 1 as well, its guide 8 is likewise deflected in the operating direction x. The guide 8 of the right-hand contactor 1 in this case acts directly on the blocking element 6 in the corresponding operating region 10, which is likewise located within the blocking element width b, and is hence also within the accommodation width B. In consequence, the blocking element 6 is pressed against the blocking element holder 3 in the region of the holding chamber 12 and in a central region 13. It is thus supported against the blocking element holder 3 in the region of the holding chamber 12 and the central region 13. This prevents any further movement of the right-hand guide 8, and hence prevents operation of the right-hand contactor 1. The lower face of the holding chamber 12 and the central region 13 thus represent stops 12, 13 arranged underneath the operating region 10.

[0030] The guide 8 of the right-hand contactor 1 exerts an operating force F in the operating direction x onto the blocking element 6 when an attempt is made to operate it. However, since it acts within the accommodation width B, the operating force F acts directly on the blocking element holder 3, that is to say, in particular, without any deflection and hence without any shear forces occurring. Essentially only compression forces, but no tensile forces

or shear forces, thus occur, to be precise both in the guides 8 and in the blocking element 6.

[0031] As already mentioned, the contactors 1 may have any desired configuration. In particular, they may be either in the form of air contactors or vacuum contactors. A combination of an air contactor and a vacuum contactor is also possible.

[0032] The invention being thus described, it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a departure from the spirit and scope of the invention, and all such modifications as would be obvious to one skilled in the art are intended to be included within the scope of the following claims.

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Description

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Contactor arrangement

- 5 The present invention relates to a contactor arrangement having two contactors and a blocking element,
- with the contactors having guides for contact supports,
 - 10 - with the blocking element being deflected from an intermediate position to a blocking position by the guide of the operated contactor when one of the contactors is operated, which blocking position prevents operation of the unoperated
 - 15 contactor,
 - with the guide of the unoperated contactor acting in an operating region on the blocking element if an attempt is made to operate the unoperated contactor, and
 - 20 - with the guides acting directly on the blocking element.

Contactor arrangements such as these are known, for example, from DE 195 48 480 C1 or DE 24 40 361 A1.

- 25 EP 0 313 954 A1 discloses a contactor arrangement having two contactors and a blocking element, in which the contactors have guides for contact supports, the blocking element is deflected from an intermediate
- 30 position to a blocking position by the guide of the operated contactor when one of the contactors is operated, which blocking position prevents operation of the unoperated contactor, the guide of the unoperated contactor acts in an operating region on the blocking
- 35 element if an attempt is made to operate the unoperated contactor. The guides act directly on the blocking element via pins.

Electrical loads are often connected to a supply network in different ways. One example of such types of connection is the optional connection of a load in star or delta to a three-phase network or to a reversing circuit, in which either the polarity of the DC voltage is reversed or a three-phase network is connected to a load alternatively with a positive phase sequence and a negative phase sequence.

The electrical load is generally connected to the supply network via contactors. If both contactors were operated at the same time, this would result in a short between the phases. Such simultaneous operation of both
5 contactors must therefore be prevented. In the prior art, this is achieved by the contactor arrangements that have been mentioned.

If repeated attempts are made to operate the unoperated
10 contactor, fatigue occurs over the course of time in the blocking elements used in the prior art mentioned initially. Finally, they break, so that they can no longer carry out their function.

In the contactor arrangement according to EP 0 313 954 A1, the blocking element is coupled to the movement of the contact supports via pins, which are inserted at the side into the contact support guide. The movement of the contact supports is thus
15 transmitted to the blocking element via the pins. When the blocking element is in the blocking position, then the movement of the contact support is blocked via the pin. This likewise prevents the unoperated contactor from being operated. In practice, it has been found
20 that the high forces that occur result in the pins breaking off. The pins thus represent a weakness in this contactor arrangement.
25

The object of the present invention is to provide a
30 contactor arrangement in which the guides act directly on the blocking element, and in which no fatigue nevertheless occurs in the blocking element.

The object is achieved in that essentially only
35 compression forces occur in the blocking element as a result of any attempt to operate it.

The invention is based on the knowledge that fatigue in

1999P03685

- 2a -

the blocking elements or the pins is caused by tensile
and/or bending

stresses. If the stress is essentially purely compressive, on the other hand, virtually no material fatigue occurs.

5 An essentially purely compressive stress can be produced particularly easily if, when an attempt to operate it is made, the blocking element is pressed underneath the operating region against at least one stop, so that the blocking element is supported on the
10 at least one stop during the attempt to operate it.

If, in addition, essentially only compression forces occur in the guide of the unoperated contactor when an attempt is made to operate it, virtually no material
15 fatigue occurs in the guide of the unoperated contactor, either.

The contactor arrangement has a particularly simple design if side surfaces of the contactors face one
20 another, the blocking element is arranged in a blocking element holder, and the blocking element holder is arranged between the contactors.

The creation of essentially only compression forces in
25 the guide of the unoperated contactor can be achieved, in design terms, particularly easily if the blocking element can pivot in a pivoting plane which runs at right angles to the side surfaces.

30 The mechanical design becomes even simpler if the guides act on the blocking element in an operating direction, and the operating direction runs parallel to the side surfaces.

35 If the blocking element holder is arranged at least partially recessed in the contactors, the contactor arrangement occupies only a small amount of space. The occupied space is a minimum when the side surfaces are adjacent to one another.

If the contactors each have one front face and one rear face, which is opposite the front face, and the rear faces and the blocking element holder end flush with one another, this necessarily results in the blocking
5 element being positioned in a defined manner. There is no longer any need for adjustments.

If the blocking element is in the form of a rotating cardioid, the blocking element operates particularly
10 reliably.

In principle, the contactors may be of any desired configuration. Generally, however, at least three load
15 contacts can respectively be operated via the contact supports.

Further advantages and details result from the following description of an exemplary embodiment. In this case, illustrated in outline form,
20

Figure 1 shows a contactor arrangement,
Figure 2 shows a detail from Figure 1, in the form of a section, and
Figure 3 shows a blocking element in a blocking
25 element holder, in the form of a section.

Figure 1 shows two contactors 1. One of the contactors 1 is shown in detail in this case, while the other contactor 1 is illustrated only schematically. The
30 contactors 1 have side surfaces 2 which face one another, and a blocking element holder 3 is arranged between the contactors.

It is possible to arrange the contactors 1 at a
35 distance from one another. However, preferably the side surfaces 2 are adjacent to one another. In this case in particular, the blocking element holder 3 is arranged completely or partially recessed in the contactors 1.

1999P03685

- 4a -

The contactors 1 each have one front face 4 and one rear face 5, which is opposite the front face 4. The rear faces 5

1999P03685

and the blocking element holder 3 end flush with one another.

5 The blocking element holder 3 has an unobstructed accommodation width B. A blocking element 6 is arranged in the blocking element holder 3 and has a blocking element width b, which is slightly smaller than the unobstructed accommodation width B.

10 As can be seen from Figures 2 and 3, the blocking element is held in the blocking element holder 3 such that it can pivot in a pivoting plane 7. The accommodation width B extends at right angles to this pivoting plane 7. The side surfaces 2 and the pivoting
15 plane 7 are at right angles to one another.

The contactors 1 have guides 8 for contact supports. At least one load contact can be operated by each of the contact supports. Preferably, even at least three load
20 contacts can be operated via the contact supports. This makes it possible to connect a three-phase network to a load.

The blocking element 6 shown in Figures 2 and 3 is in
25 the form of a so-called rotating cardioid 6 which has a cardioid tip 9 and operating regions 10. If neither contactor 1 is operated, the rotating cardioid 6 is held by a resetting spring 11 in an intermediate position, which is illustrated in Figures 2 and 3. By
30 way of example, it is assumed in the following text that the left-hand one of the two contactors 1 is now operated first of all, and an attempt is then made to operate the right hand one of the two contactors 1, as well.

35

The operation of the left-hand contactor 1 results in its guide 8 being moved in an operating direction x. The operating direction x runs parallel to the side

1999003685

- 5a -

surfaces 2 and parallel to the pivoting plane 7. The operation of the left-hand guide 8 results in the cardioid tip 9 of the blocking element 6 being deflected into a holding chamber 12, which is
5 essentially arranged underneath the guide 8 of the right-hand contactor 1. In

this position, the blocking element 6 is located in a blocking position, in which it is impossible to operate the right-hand contactor 1. The guide 8 in this case acts directly on the blocking element 6 in the operating region 10, which is located within the blocking element width b and hence, in particular, also within the accommodation width B .

If an attempt is now made to operate the right-hand contactor 1 as well, its guide 8 is likewise deflected in the operating direction x . The guide 8 of the right-hand contactor 1 in this case acts directly on the blocking element 6 in the corresponding operating region 10, which is likewise located within the blocking element width b , and is hence also within the accommodation width B . In consequence, the blocking element 6 is pressed against the blocking element holder 3 in the region of the holding chamber 12 and in a central region 13. It is thus supported against the blocking element holder 3 in the region of the holding chamber 12 and the central region 13. This prevents any further movement of the right-hand guide 8, and hence prevents operation of the right-hand contactor 1. The lower face of the holding chamber 12 and the central region 13 thus represent stops 12, 13 arranged underneath the operating region 10.

The guide 8 of the right-hand contactor 1 exerts an operating force F in the operating direction x onto the blocking element 6 when an attempt is made to operate it. However, since it acts within the accommodation width B , the operating force F acts directly on the blocking element holder 3, that is to say, in particular, without any deflection and hence without any shear forces occurring. Essentially only compression forces, but no tensile forces or shear forces, thus occur, to be precise both in the guides 8 and in the blocking element 6.

1999P03685

- 6a -

As already mentioned, the contactors 1 may have any desired configuration. In particular, they may be either in the form of air contactors or vacuum

1999P03685

- 7 -

contactors. A combination of an air contactor and a vacuum contactor is also possible.

1999P03685

Patent Claims

1. A contactor arrangement having two contactors (1) and a blocking element (6),
- 5 - with the contactors (1) having guides (8) for contact supports,
- with the blocking element (6) being deflected from an intermediate position to a blocking position by the guide (8) of the operated contactor (1) when
- 10 one of the contactors (1) is operated, which blocking position prevents operation of the unoperated contactor (1),
- with the guide (8) of the unoperated contactor (1) acting in an operating region (10) on the blocking
- 15 element (6) if an attempt is made to operate the unoperated contactor (1), and
- with the guides (8) acting directly on the blocking element (6),
- characterized
- 20 in that essentially only compression forces occur in the blocking element (6) as a result of the attempt to operate it.
2. The contactor arrangement as claimed in claim 1,
- 25 characterized
- in that, when an attempt is made to operate it, the blocking element (6) is pressed underneath the operating region (10) against at least one stop (12, 13), such that the blocking element (6) is supported on
- 30 the at least one stop (12, 13) during the operating attempt.
3. The contactor arrangement as claimed in claim 1 or 2,
- 35 characterized
- in that, when an attempt is made to operate it, essentially only compression forces also occur in the guide (8) of the unoperated contactor (1).

199P03685

- 8a -

4. The contactor arrangement as claimed in claim 1, 2
or 3,
characterized

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in that the side surfaces (2) of the contactors (1) face one another, in that the blocking element (6) is arranged in a blocking element holder (3), and in that the blocking element holder (3) is arranged between the
5 contactors (1).

5. The contactor arrangement as claimed in claim 4, characterized
in that the blocking element (6) can pivot in a
10 pivoting plane (7) which runs at right angles to the side surfaces (2).

6. The contactor arrangement as claimed in claim 4 or 5,
15 characterized
in that the guides (8) act on the blocking element (6) in an operating direction (x), and in that the operating direction (x) runs parallel to the side surfaces (2).

20 7. The contactor arrangement as claimed in claim 4, 5 or 6, characterized
in that the blocking element holder (3) is arranged at
25 least partially recessed in the contactors (1).

8. The contactor arrangement as claimed in claim 7, characterized
in that the side surfaces (2) are adjacent to one
30 another.

9. The contactor arrangement as claimed in one of claims 4 to 8, characterized
35 in that the contactors (1) each have one front face (4) and one rear face (5), which is opposite the front face (4), and in that the rear faces (5) and the blocking element holder (3) end flush with one another.

10. The contactor arrangement as claimed in one of the
above claims,
characterized
in that the blocking element (6) is in the form of a
5 rotating cardioid (6).

11. The contactor arrangement as claimed in one of the above claims, characterized in that at least three load contacts can respectively
- 5 be operated via the contact supports.

1999P03685

Abstract

Contactor arrangement

Two contactors (1) are mutually interlocked via a blocking element (6) which is arranged between the contactors (1). The blocking element (6) in this case interacts with guides (8) on the contact supports of the contactors (1). The guides (8) act directly on the blocking element (6). Only compression forces, but no tensile forces or shear forces, now occur in the blocking element (6), as a result of this and as a result of the blocking element (6) being configured in a suitable manner.

FIGURE 2

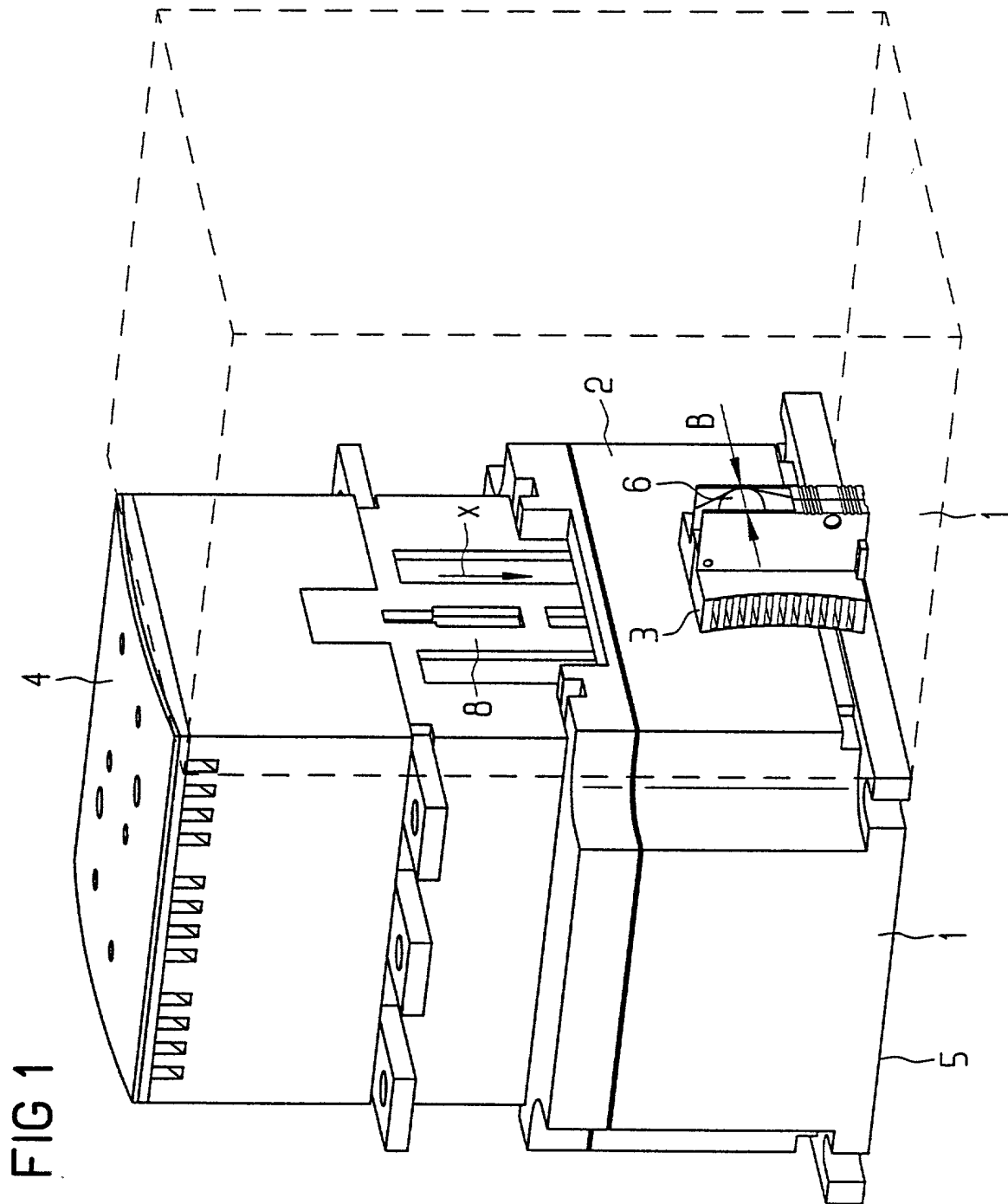
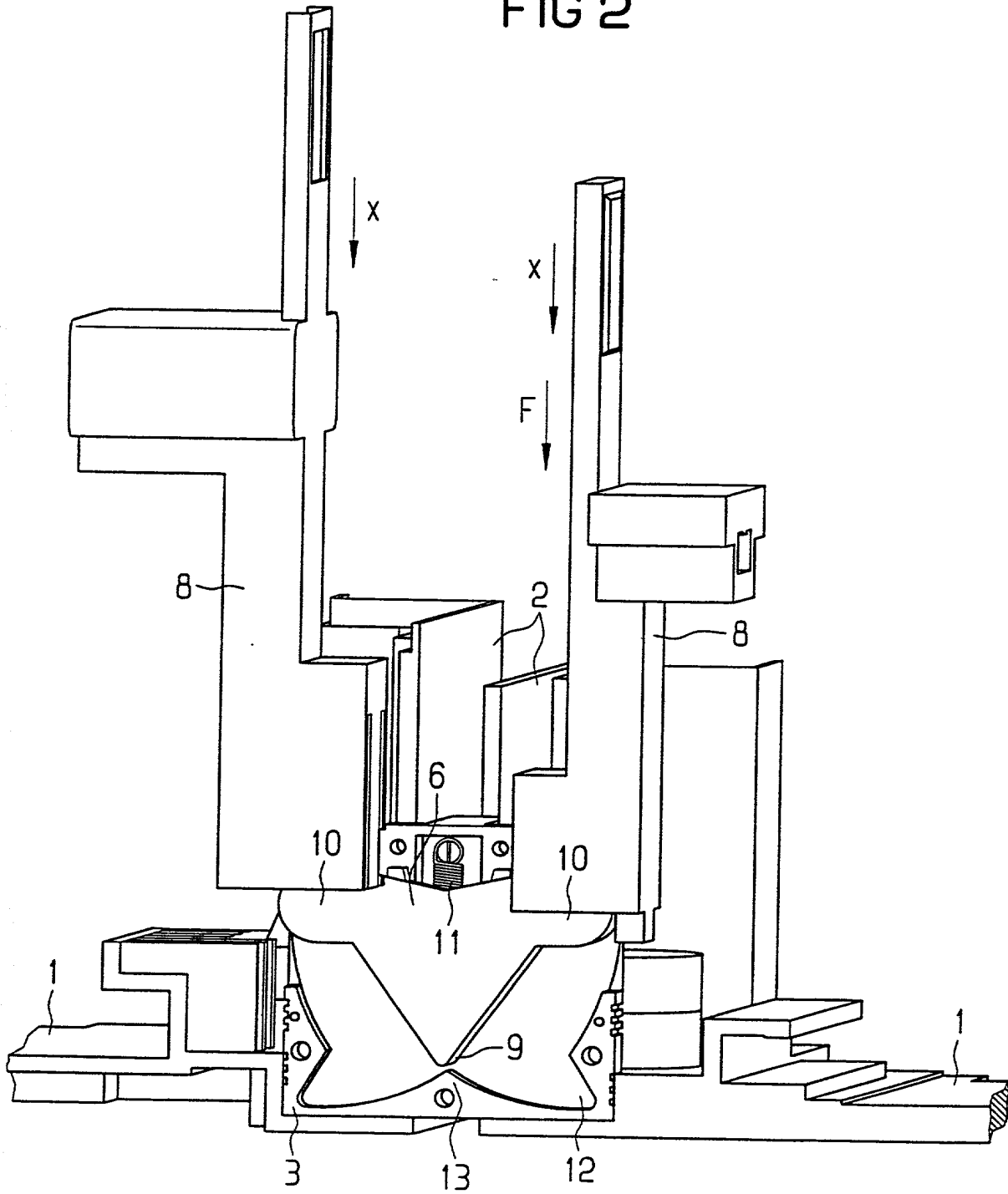
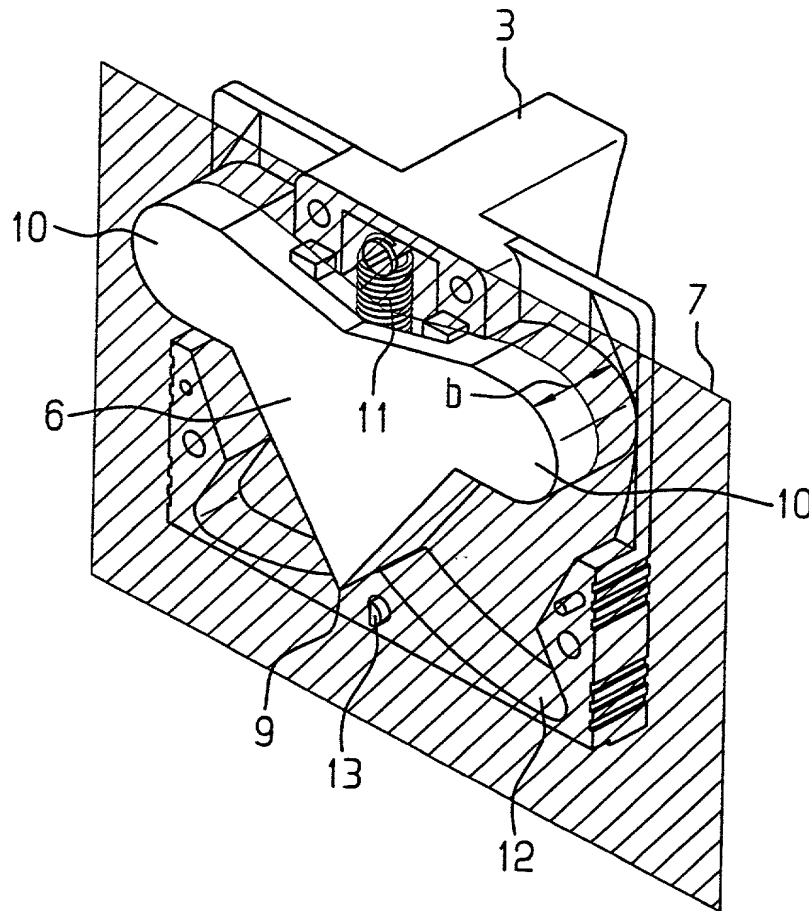


FIG 2



3/3

FIG 3



Declaration and Power of Attorney For Patent Application

Erklärung Für Patentanmeldungen Mit Vollmacht

German Language Declaration

Als nachstehend benannter Erfinder erkläre ich hiermit an Eides Statt:

As a below named inventor, I hereby declare that:

dass mein Wohnsitz, meine Postanschrift, und meine Staatsangehörigkeit den im Nachstehenden nach meinem Namen aufgeführten Angaben entsprechen,

My residence, post office address and citizenship are as stated below next to my name,

dass ich, nach bestem Wissen der ursprüngliche, erste und alleinige Erfinder (falls nachstehend nur ein Name angegeben ist) oder ein ursprünglicher, erster und Miterfinder (falls nachstehend mehrere Namen aufgeführt sind) des Gegenstandes bin, für den dieser Antrag gestellt wird und für den ein Patent beantragt wird für die Erfindung mit dem Titel:

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

Schützenordnung

Contactor arrangement

deren Beschreibung

the specification of which

(zutreffendes ankreuzen)

(check one)

☐ hier beigefügt ist.

☐ is attached hereto.

☒ am 21.09.2000 als

☒ was filed on 21.09.2000 as

PCT internationale Anmeldung

PCT international application

PCT Anwendungsnummer PCT/DE00/03296

PCT Application No. PCT/DE00/03296

eingereicht wurde und am

and was amended on

abgeändert wurde (falls tatsächlich abgeändert).

(if applicable)

Ich bestätige hiermit, dass ich den Inhalt der obigen Patentanmeldung einschliesslich der Ansprüche durchgesehen und verstanden habe, die eventuell durch einen Zusatzantrag wie oben erwähnt abgeändert wurde.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims as amended by any amendment referred to above.

Ich erkenne meine Pflicht zur Offenbarung irgendwelcher Informationen, die für die Prüfung der vorliegenden Anmeldung in Einklang mit Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) von Wichtigkeit sind, an.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

Ich beanspruche hiermit ausländische Prioritätsvorteile gemäss Abschnitt 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 119 aller unten angegebenen Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde, und habe auch alle Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde nachstehend gekennzeichnet, die ein Anmeldedatum haben, das vor dem Anmeldedatum der Anmeldung liegt, für die Priorität beansprucht wird.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

German Language Declaration

Prior foreign applications

Priorität beansprucht

Priority Claimed

19946207.0

DE

27.09.1999

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(Number)

(Country)

(Day Month Year Filed)

Yes

No

(Nummer)

(Land)

(Tag Monat Jahr eingereicht)

Ja

Nein

(Number)

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(Day Month Year Filed)

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(Tag Monat Jahr eingereicht)

Yes

No

Ja

Nein

(Number)

(Country)

(Day Month Year Filed)

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(Nummer)

(Land)

(Tag Monat Jahr eingereicht)

Yes

No

Ja

Nein

Ich beanspruche hiermit gemäss Absatz 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 120, den Vorzug aller unten aufgeführten Anmeldungen und falls der Gegenstand aus jedem Anspruch dieser Anmeldung nicht in einer früheren amerikanischen Patentanmeldung laut dem ersten Paragraphen des Absatzes 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 122 offenbart ist, erkenne ich gemäss Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) meine Pflicht zur Offenbarung von Informationen an, die zwischen dem Anmeldedatum der früheren Anmeldung und dem nationalen oder PCT internationalen Anmeldedatum dieser Anmeldung bekannt geworden sind.

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §122, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application.

PCT/DE00/03296

(Application Serial No.)
(Anmeldeseriennummer)

21.09.2000

(Filing Date D, M, Y)
(Anmeldedatum T, M, J)

(Status)

(patentiert, anhängig,
aufgegeben)

pending

(Status)
(patented, pending,
abandoned)

(Application Serial No.)
(Anmeldeseriennummer)

(Filing Date D,M,Y)
(Anmeldedatum T, M, J)

(Status)

(patentiert, anhängig,
aufgeben)

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(patented, pending,
abandoned)

Ich erkläre hiermit, dass alle von mir in der vorliegenden Erklärung gemachten Angaben nach meinem besten Wissen und Gewissen der vollen Wahrheit entsprechen, und dass ich diese eidesstattliche Erklärung in Kenntnis dessen abgebe, dass wissentlich und vorsätzlich falsche Angaben gemäss Paragraph 1001, Absatz 18 der Zivilprozessordnung der Vereinigten Staaten von Amerika mit Geldstrafe belegt und/oder Gefängnis bestraft werden können, und dass derartig wissentlich und vorsätzlich falsche Angaben die Gültigkeit der vorliegenden Patentanmeldung oder eines darauf erteilten Patentes gefährden können.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

German Language Declaration

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POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. *(list name and registration number)*

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And I hereby appoint

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| Wohnsitz | Residence |
| Staatsangehörigkeit | Citizenship |
| Postanschrift | Post Office Address |
| | |

(Bitte entsprechende Informationen und Unterschriften im Falle von dritten und weiteren Miterfindern angeben).

(Supply similar information and signature for third and subsequent joint inventors).